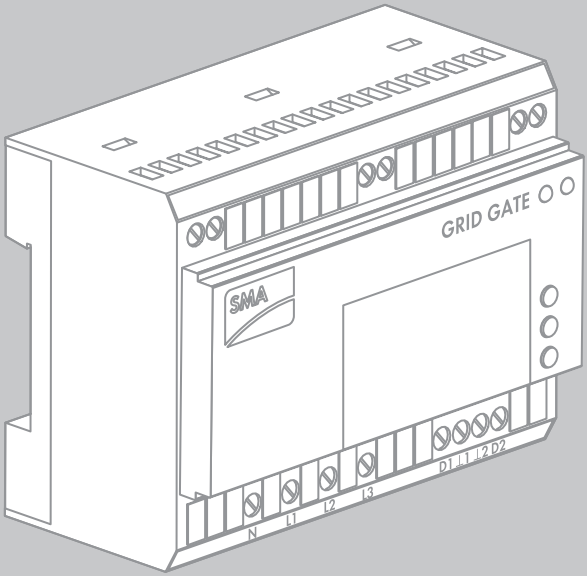
Accessories for power generation plants in Italy

SMA GRID GATE

Installation Manual



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1 Information on this Document

Validity

This document is valid for "GRIDGATE-11" device types.

Target Group

This document is for skilled persons. Only skilled persons are allowed to perform the tasks set forth in this document (see Section 2.2 "Qualification of Skilled Persons", page 9).

Symbols

Symbol	Explanation
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE	Indicates a situation which, if not avoided, could result in property damage
i	Information that is important for a specific topic or goal, but is not safety-relevant
☐	Indicates an essential requirement for achieving a specific goal
☑	Desired result
✖	A problem that might occur

Typography

Typography	Usage	Example
bold	• Display messages • Parameters • Connections • Slots • Elements to be selected • Elements to be entered	• Select the **DigIn2** parameter and set to **ExtComm**.
>	• Several elements that are to be selected	• Select **Settings > Date**.

Abbreviations

Abbreviation	Description	Explanation
AC	Alternating Current	–
MSL	Mean Sea Level	–

2 Safety

2.1 Intended Use

The SMA Grid Gate is an external grid and plant protection for use in Italy. It interrupts the connection between the power generation plant and the electricity grid in the event of disturbances in the voltage or frequency by controlling up to two section switches. The number of section switches depends on the plant power. In plants of between 6 kW and 20 kW, disconnection from the electricity grid is performed via one section switch. In plants of over 20 kW, two section switches are required.

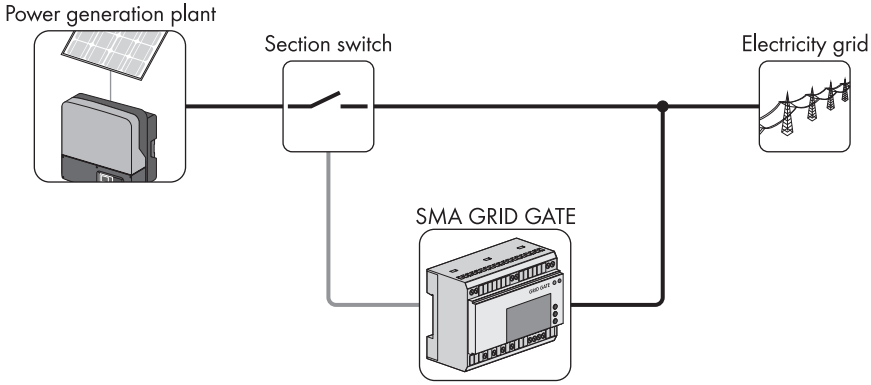


Figure 1: Principle of a plant of between 6 kW and 20 kW with SMA Grid Gate

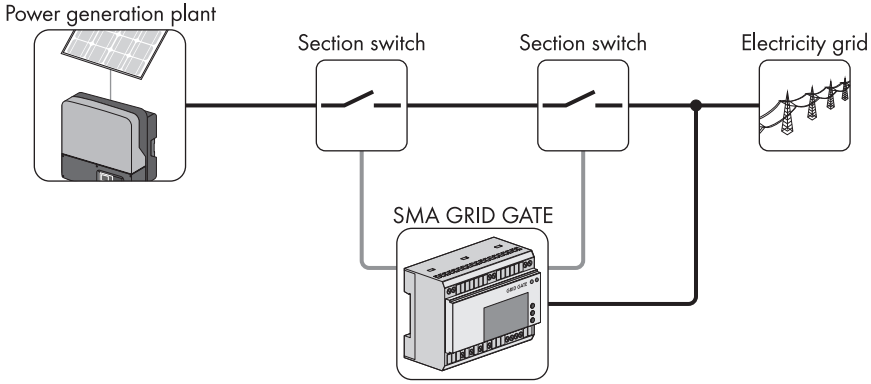


Figure 2: Principle of a plant of over 20 kW with SMA Grid Gate

The SMA Grid Gate is suitable for indoor use only.

The SMA Grid Gate does not replace the function of islanding detection. Islanding detection must be performed by the power generation plant.

Furthermore, the SMA Grid Gate does not prevent unbalanced load. Protection against unbalanced load must also be ensured by the power generation plant.

For safety reasons, it is not permitted to modify the product or install components that are not explicitly recommended or distributed by SMA Solar Technology AG for this product.

Only use the SMA Grid Gate in accordance with the information provided in the enclosed documentation. Any other use may result in personal injury or property damage.

The enclosed documentation is an integral part of this product. You must read and adhere to this documentation to enable proper and optimum use of the SMA Grid Gate. Keep the documentation in a convenient place for future reference.

2.2 Qualification of Skilled Persons

The work described in this document must only be performed by skilled persons. Skilled persons must have the following qualifications:

- Knowledge of how the device works and is operated
- Training in how to deal with the dangers and risks involved in installing and operating electrical devices and plants
- Training in the installation and commissioning of electrical devices and plants
- Knowledge of the applicable standards and directives
- Knowledge of and compliance with this document and all the safety precautions

2.3 Safety Precautions

Electric Shock

Risk of lethal electric shock if work on electrical devices is not performed properly

- All work on the SMA Grid Gate must be performed by skilled persons only.
- Disconnect electrical devices from any voltage sources before working on them.

Electrostatic Discharge

Touching electronic components may result in damage to and destruction of the SMA Grid Gate due to electrostatic discharge.

- Earth yourself before touching any components.
- Do not touch any components other than those described in this document.

Changing Parameters

Improper changing of parameters may result in grid failures, yield loss, damage to the power generation plant or the SMA Grid Gate and personal injury. The operating licence may also be revoked.

- Always consult the network operator before changing parameters.

3 Scope of Delivery

Check the delivery for completeness and any externally visible damage. Contact your specialist dealer if the delivery is incomplete or damaged.

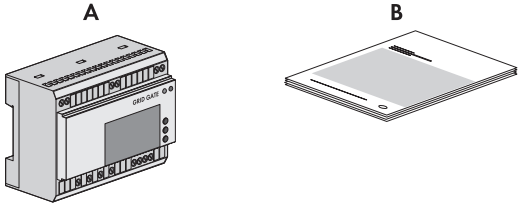


Figure 3: Components included in delivery

Position	Quantity	Designation
A	1	SMA Grid Gate
B	1	Installation manual

4 Product Description

4.1 SMA Grid Gate

The SMA Grid Gate is an external grid and plant protection for use in Italy. It interrupts the connection between the power generation plant and the electricity grid in the event of disturbances in the voltage or frequency by controlling up to two section switches. The number of section switches depends on the plant power. In plants of between 6 kW and 20 kW, disconnection from the electricity grid is performed via one section switch. In plants of over 20 kW, two section switches are required.

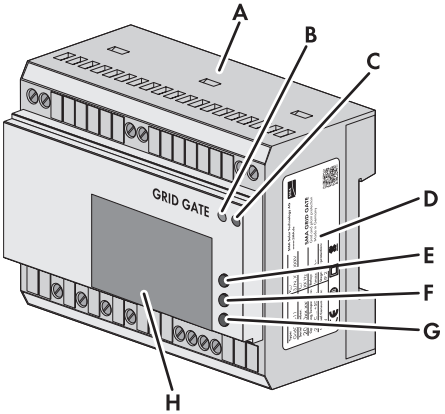


Figure 4: SMA Grid Gate

Position	Designation
A	SMA Grid Gate
B	Green LED
C	Red LED
D	Type label
E	Top button
F	Middle button
G	Bottom button
H	Graphic display

The SMA Grid Gate monitors the three line conductors from the electricity grid for disturbances in the voltage and frequency. If the lower limit is not met or the upper limit is exceeded, the SMA Grid Gate disconnects the power generation plant from the electricity grid by opening two section switches.

4.2 Type Label

The type label is on the right-hand side of the SMA Grid Gate.

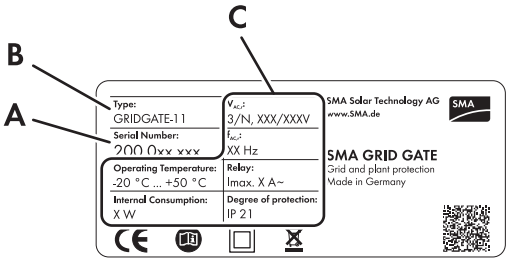


Figure 5: Layout of the type label

Position	Designation	Explanation
A	Type	SMA Grid Gate device type
B	Serial Number	SMA Grid Gate serial number
C	Device-specific characteristics	–

You require the information on the type label to use the device safely and for customer support from the SMA Service Line. The type label must be permanently affixed to the SMA Grid Gate.

Symbols on the Type Label

Symbol	Designation	Explanation
CE	CE marking	The product conforms to the requirements of the applicable EC directives.
	Observe the documentation.	Observe all documentation that is supplied with the product.
	Protection class II	The product has protective insulation. The protective insulation prevents live electrical parts from being touched.
	WEEE designation	Do not dispose of the product together with the household waste but in accordance with the locally applicable disposal regulations for electronic waste.

4.3 Digital Inputs

The remote shutdown can be realised via the first digital input (D1), If the parameter **DigIn1** is set to **ExtOFF** and no signal is present at D1, the remote shutdown will be active and the SMA Grid Gate switches the section switches off.

The second digital input (D2) receives the communication signal. If the parameter **DigIn2** is set to **ExtComm** and no signal from D2 is present, the communication does not work properly and the frequency is tested for the limits **f<c** and **f>c**.

If the parameter **DigIn1** or **DigIn2** is set to **Disabled**, the function of the respective digital input will be deactivated.

The voltage supply of the two digital inputs must be between 12 V and 24 V.

4.4 Adjustable Parameters

Name	Description	Value/Range	Resolution
U<<	Voltage drop protection	0 V ... 300 V	0.1 V
U<	Voltage drop protection	46 V ... 300 V	0.1 V
U>>	Voltage rise protection	46 V ... 300 V	0.1 V
U>	Voltage rise protection	46 V ... 300 V	0.1 V
Ua>	Voltage rise protection, adjustable average value in minutes	46 V ... 300 V	0.1 V
t(U<<)	Disconnection time for U<<	0.04 s ... 300 s	0.02 s
t(U<)	Disconnection time for U<	0.04 s ... 300 s	0.02 s
t(U>>)	Disconnection time for U>>	0.04 s ... 300 s	0.02 s
t(U>)	Disconnection time for U>	0.04 s ... 300 s	0.02 s
t(Ua>)	Disconnection time for Ua>	0.2 s ... 10 s	0.02 s
T(Ua>)	Duration for average value Ua>	1 min ... 15 min	1 min
f<<	Frequency drop protection	44 Hz ... 65 Hz	0.01 Hz
f<	Frequency drop protection	44 Hz ... 65 Hz	0.01 Hz
f<c	Frequency drop protection, if no communication	44 Hz ... 65 Hz	0.01 Hz
f>>	Frequency rise protection	44 Hz ... 65 Hz	0.01 Hz
f>	Frequency rise protection	44 Hz ... 65 Hz	0.01 Hz
f>c	Frequency rise protection, if no communication	44 Hz ... 65 Hz	0.01 Hz
t(f<<)	Disconnection time for f<<	0.04 s ... 300 s	0.02 s

Name	Description	Value/Range	Resolution
t(f<)	Disconnection time for f<	0.04 s ... 300 s	0.02 s
t(f<c)	Disconnection time for f<c	0.04 s ... 300 s	0.02 s
t(f>>)	Disconnection time for f>>	0.04 s ... 300 s	0.02 s
t(f>)	Disconnection time for f>	0.04 s ... 300 s	0.02 s
t(f>c)	Disconnection time for f>c	0.04 s ... 300 s	0.02 s
Recon Min U	Reconnection threshold undervoltage	46 V ... 300 V	0.1 V
Recon Max U	Reconnection threshold overvoltage	46 V ... 300 V	0.1 V
Recon Min f	Reconnection threshold under-frequency	44 Hz ... 65 Hz	0.01 Hz
Recon Max f	Reconnection threshold over-frequency	44 Hz ... 65 Hz	0.01 Hz
Start time	Connection time after start	2 s ... 1 600 s	1 s
Connection time	Reconnection time after normal grid error	0 s ... 1 600 s	1 s
SB	Maximum duration of a short interruption (short break)	0 s ... 400 s*	1 s
Time after SB	Reconnection time after SB	2 s ... 1600 s	1 s
DigIn1	Setting of the first digital input	Disabled, ExtOFF	–
DigIn2	Setting of the second digital input	Disabled, ExtComm	–
t(ExtOFF)	Disconnection time for remote shutdown	0.02 s ...10 s	0.02 ms
Country data set	Country data set used	CEI 0-21	–
Number of relays	Number of section switches used	1, 2	–

* If SB = 0 s, the short interruption is deactivated.

4.5 Default Settings for CEI 0-21

The SMA Grid Gate has the following default values for CEI 0-21 in order to meet the requirements of the CEI 0-21.

Observe Limiting Values

Pay attention to ensuring that no disconnection thresholds are exceeded or undercut. Additionally, no remote shutdown command must be present via the first digital input **D1.**

Disconnection Conditions

Function	Limiting value	Disconnection time
Voltage drop protection U<<	92.0 V	200 ms
Voltage drop protection U<	195.5 V	400 ms
Voltage drop protection U>>	300.0 V	300 s
Voltage increase protection U>	264.5 V	200 ms
Voltage increase protection Ua>, (Default setting of average value length = 10 min)	253.0 V	2 s
Disconnection time for remote shutdown*	–	20 ms
Frequency drop protection f<<	44.0 Hz	300 s
Frequency drop protection f<	47.5 Hz	100 ms
Frequency drop protection, if no communication f<c**	49.5 Hz	100 ms
Frequency increase protection f>>	65.0 Hz	300 s
Frequency increase protection f>	51.5 Hz	100 ms
Frequency increase protection, if no communication f>c**	50.5 Hz	100 ms

* Can be activated using the first digital input **DigIn1**.

** Can be activated using the second digital input **DigIn2**.

Connection Conditions

Function	Limiting value	Connection time*
Connection time after start	–	30 s
Upper voltage limit after start	253.0 V	30 s
Lower voltage limit after start	195.5 V	30 s
Upper frequency limit after start	50.1 Hz	30 s
Lower frequency limit after start	49.9 Hz	30 s
Reconnection time after fault	–	0 s
Upper voltage limit after grid error	300.0 V	100 ms
Lower voltage limit after grid error	46.0 V	100 ms
Upper frequency limit after grid error	65.0 Hz	100 ms
Lower frequency limit after grid error	44.0 Hz	100 ms
Maximum duration of a short interruption	–	0 s**
Reconnection time after short interruption	–	5 s

* The values must be within the limits during the connection period.

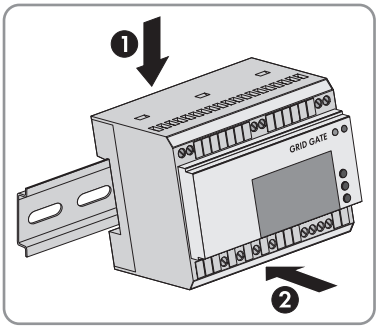
** 0 s = deactivated

5 Mounting the SMA Grid Gate

Requirements for the mounting location:

- ☐ The top-hat rail for mounting must be mounted in the switch cabinet or meter cabinet.
- ☐ The mounting location must be suitable for the weight and dimensions of the SMA Grid Gate (see Section 12 "Technical Data", page 39).
- ☐ The mounting location must be easy and safe to access at all times, without the need for additional aids (e.g. scaffolding or lifting platforms). If this is not the case, future service assignments may be restricted.
- ☐ The climatic conditions must be met (see Section 12 "Technical Data", page 39).

1. Position the SMA Grid Gate with the upper enclosure bracket on the top-hat rail and push it back against the top-hat rail.



2. Push the lower enclosure bracket back until the SMA Grid Gate engages.

6 Electrical Connection

6.1 Safety During Electrical Connection

Electric Shock

Danger to life due to high voltages

- Observe the five safety rules before connecting the SMA Grid Gate.

6.2 Overview of the Connection Area

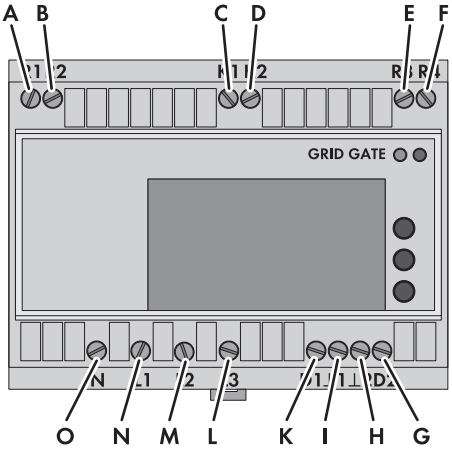


Figure 6: Connection area of the SMA Grid Gate

Position	Designation	Description
A	Terminal **R1**	Potential-free switching contact (make contact) for controlling section switch 1
B	Terminal **R2**	
C	Terminal **K1**	Feedback contact for section switch 1
D	Terminal **K2**	Feedback contact for section switch 2
E	Terminal **R3**	Potential-free switching contact (make contact) for controlling section switch 2
F	Terminal **R4**	
G	Terminal **D2**	Terminal for second digital input
H	Terminal ⊥2	Earth terminal for D2 for remote shutdown
I	Terminal ⊥1	Earth terminal for D1 for frequency restriction
K	Terminal **D1**	Terminal for first digital input

Position	Designation	Description
L	Terminal **L3**	Measuring contact for line conductor L3
M	Terminal **L2**	Measuring contact for line conductor L2
N	Terminal **L1**	Measuring contact for line conductor L1 and voltage supply
O	Terminal **N**	Terminal for neutral conductor N

6.3 Connecting the SMA Grid Gate

Additionally required material (not included in scope of delivery):

- ☐ For a plant power of between 6 kW and 20 kW, there must be one section switch for grid disconnection.
- ☐ For a plant power of over 20 kW, there must be two section switches for grid disconnection.
- ☐ Rigid or flexible cable
- ☐ For flexible cables: bootlace ferrules with insulation
- ☐ Fuses for the SMA Grid Gate: maximum 16 A

Requirements for the section switches:

- ☐ The section switches must be designed according to the plant power.
- ☐ The section switches must have a switch-on delay of no more than 20 s.
- ☐ The section switches must have a switch-off time of no more than 50 ms.
- ☐ Category of section switches for power generation plants with provision of reactive power: AC3.
- ☐ Category of section switches for power generation plants with no provision of reactive power: AC1.

Cable requirements:

- ☐ External diameter: 0.5 mm ... 1.8 mm
- ☐ Conductor cross-section: 0.2 mm² ... 2.5 mm²
- ☐ Cable length for connecting the digital inputs must not exceed 30 m.

Connection diagram without feedback contact

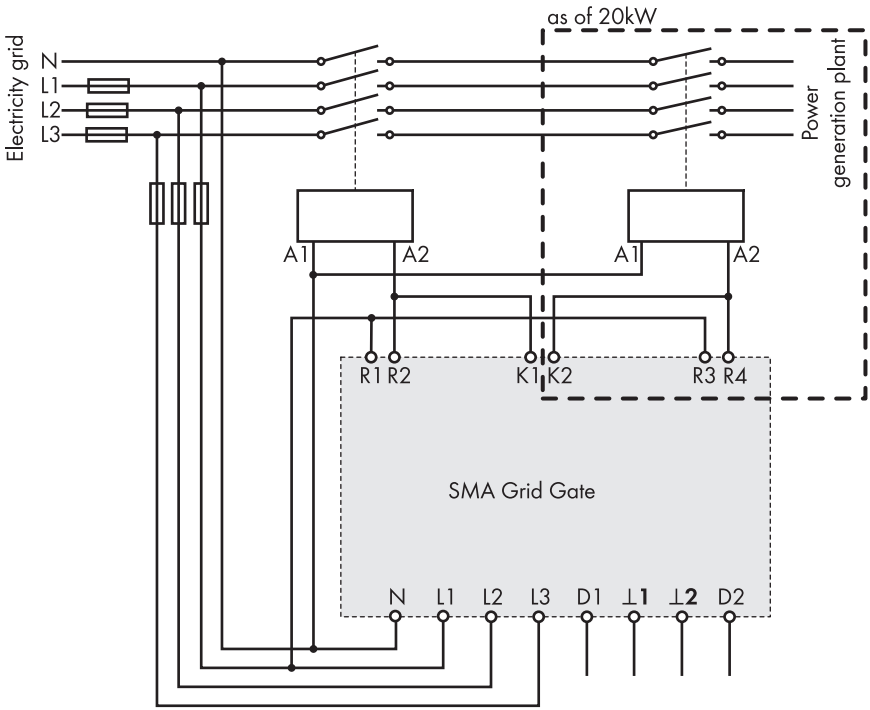


Figure 7: Connection diagrams without feedback contact: 1 section switch for installations from 6 kW to 20 kW and 2 section switches for installations over 20 kW

Connection diagram with feedback contact

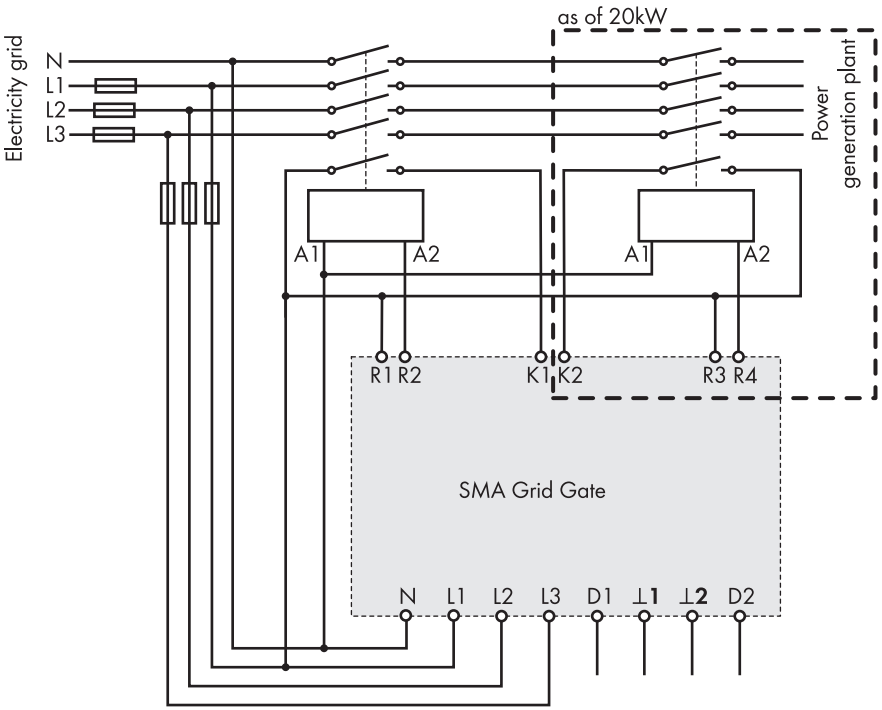
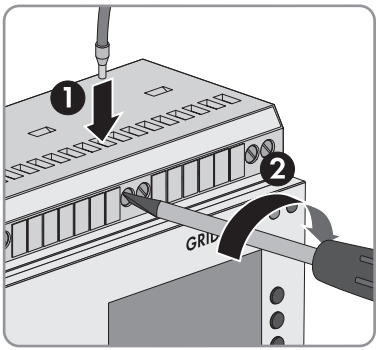


Figure 8: Connection diagrams with feedback contact: 1 section switch for installations from 6 kW to 20 kW and 2 section switches for installations over 20 kW

1. Strip 8 mm from the cable insulation.
2. For flexible cables, push bootlace ferrules onto the cable ends.
3. Release the screw terminal using a screwdriver.
4. Lay the cables in the cable route according to the connection diagram and use a screwdriver to tighten the screw terminal (torque: 0.5 Nm ... 0.6 Nm).
5. When using 1 section switch, connect the section switch exclusively to terminals **R1**, **R2** and **K1.** No other connection combination is possible here.



6. Make sure that the cables are positioned securely in the terminal blocks

7 Commissioning

1. Switch on the fuse of the SMA Grid Gate.
2. Switch on the miniature circuit-breaker of the electricity grid.
3. Commission the power generation plant (see installation manual of power generation plant).
4. Use the middle button to confirm **Italiano** as the language.
   ✖ Does the graphic display indicate an error?
   - Eliminate the error (see Section 9.3 "Error Messages", page 33).
5. Use the middle button to confirm the country data set **CEI 0-21**.
   ✖ Does the graphic display indicate an error?
   Eliminate the error (see Section 9.3 "Error Messages", page 33).
6. Select the number of section switches:
   - For a plant power of over 20 kW, use the middle button to confirm **2 (>20KW)**.
   - For a plant power of between 6 kW and 20 kW, use the arrow button to select **1 (<=20kW)** and use the middle button to confirm.

   ☑ The graphic display shows the **Overview** after the self-test and grid check.
   ✖ Does the graphic display indicate an error?
   It is likely that the connection of the SMA Grid Gate is incorrect.
   - Eliminate the error (see Section 9.3 "Error Messages", page 33).

☑ If the voltage and frequency are within the permissible range for 30 seconds and no buttons are pressed, the SMA Grid Gate closes the section switches. The power generation plant can only feed into the electricity grid once this has occurred.

8 Operation

8.1 Menu Structure

Main menu	Language		Indicates the languages available for the display messages.
		German	As language, select German.
		Italiano	As language, select Italian.
		English	As language, select English.
	Parameter display		Enables you to read out the current parameter settings.
		Voltage N-L	Indicates voltage thresholds with corresponding disconnection times for the individual line conductors to the neutral conductor.
		Voltage L-L	Indicates voltage thresholds with corresponding disconnection times between the line conductors.
		Frequency	Indicates frequency thresholds with corresponding disconnection times for frequency variation.
		Connection limits	Gives an overview of all limits for voltage and frequency.
		Connection times	Gives an overview of all connection times.
		Further parameters	Shows the current settings of the following parameters: • Digital inputs **DigIn1** and **DigIn2** • **t(ExtOFF)**: Disconnection time for remote shutdown • **Number of relays**
	Error messages		Enables you to view the last 12 error messages that led to a disconnection.

Main menu	Configuration		Enables you to set parameter values and delete error messages. You must enter the SMA Grid Guard code before parameter configuration.
		Set disconnect para	Enables you to set all available disconnection parameters.
		Set connection para	Enables you to set all available connection parameters.
		Number of relays	Enables you to select the number of section switches.
Main menu		Configure DigIn	Enables you to activate and deactivate the function of digital inputs DigIn1 and DigIn2.
		Country data set	Enables you to select the country data set, which sets all parameters according to the country standard. Changes that have been made manually are lost.
		Delete errors	Enables you to delete all entries in the error list.
		→ Main menu	Takes you back to the main menu.
	Info		Displays the serial number and firmware version of the SMA Grid Gate.
	→ Overview		Gives an overview of the voltages, power frequency and status messages.

8.2 Symbols in the Graphic Display

Operation of the SMA Grid Gate is via the 3 buttons next to the graphic display. The meaning of the buttons is shown next to the respective button in the graphic display.

Symbol	Description
	Main menu
	Confirm selection
	Scroll upwards or downwards line by line
	Scroll upwards or downwards page by page
	Back
	Error messages*
	Trigger test for the section switches
	Communication active If the parameter **DigIn2** is set to **ExtComm** and voltage is present at **D2**, this symbol appears in the first line of the overview.**
	Communication not active If the parameter **DigIn2** is set to **ExtComm** and no voltage is present at **D2**, this symbol appears in the first line of the overview.**
Adj	Abbreviation for "Adjusted". The country data set used appears in the first line of the overview. If at least 1 parameter has been changed within the country data set used, the suffix Adj appears alongside the country data set.

* The symbol blinks if there are new error messages.

** If the parameter DigIn2 is deactivated, no symbol for communication appears in the first line.

8.3 Overview

The **Overview** display shows the status of the SMA Grid Gate.

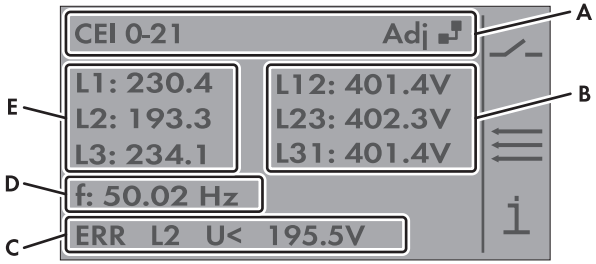


Figure 9: Screen of the graphic display during operation

Position	Description
A	Country data set, Adj, symbol for communication*
B	Voltage between L1-L2, L2-L3 and L3-L1
C	Status bar**
D	Power frequency
E	Voltage between N-L1, N-L2 and N-L3

* If you have altered parameters within the country data set, the suffix **Adj** will be shown in the display. The symbol for communication will be displayed if the parameter **DigIn2** is set to **ExtComm**.

** In the status bar you will be shown the status messages (status messages see Section 9.2).

8.4 Activating the Graphic Display

The graphic display deactivates itself automatically after 15 minutes, except during the start phase.

- Press any button to activate the graphic display.

☑ The SMA Grid Gate shows the **Overview**.

8.5 Restoring Default Settings

You can restore the default settings by reloading the country data set.

1. Select **Main menu > Configuration**.
2. Enter the SMA Grid Guard code.
3. Select **Country data set**.
4. Confirm **CEI 0-21** with middle button.

8.6 Deleting all Error Messages

1. Select **Main menu > Configuration**.
2. Enter the SMA Grid Guard code. When so doing, select the desired figures with the upper and lower button and confirm with the middle button.
3. Select **Delete errors**.
4. Hold middle button pressed for 3 seconds.

8.7 Trigger Test for Section Switches

1. Press upper button in the main menu.
2. Hold middle button pressed for 3 seconds.

☑ An error will be triggered and both section switches open. After 30 s the SMA Grid Gate again closes the section switches and returns to normal operation.

8.8 Manually Resetting Blockade of the SMA Grid Gate

For Installations over 20 kW

If a section switch does not open correctly following triggering of an error, the SMA Grid Gate will automatically be blocked. The blockade can only be reset manually.

Requirements:

☐ At least 1 section switch fails to open following triggering of an error.

☐ The LEDs flash alternately and the following error message appears in the **Overview** in the graphic display: **Blocked connection due to relay error. To override block press top button for 3s.**

☐ If the error is in the first section switch, **ERR R:K1>>** appears in the bottom line.

☐ If the error is in the second section switch, **ERR R:K2>>** appears in the bottom line.

Proceed as follows to reset the blockade:

1. Select **Main menu > Overview**.
2. If the error message **Blocked connection due to relay error. To override block press top button for 3s. ERR R:K1>>** or **ERR R:K2>> appears**, hold upper button pressed for 3 s.

   ☑ **Please wait** now appears in the bottom line. The blockade will be reset.

For Installations from 6 kW to 20 kW

Blockade of the Section Switch Deactivated

During operation with 1 section switch, the blockade of the section switch is deactivated.

9 Troubleshooting

9.1 LED Signals

The LEDs indicate the operating state of the SMA Grid Gate. The green LED indicates that the SMA Grid Gate is operating. The red LED indicates errors.

Red LED	Green LED	Explanation and corrective measures
Glowing	Off	Grid error (voltage or frequency)
Flashes once	Off	Hardware error **Corrective measures:** • Contact SMA Service Line.
Flashes twice	Off	Section switch error **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.
Off	Flashing	Start phase or connection
Off	Glowing	Normal operation
Flashing	Flashing	Parameters are being set. Section switches are open.
Alternate flashing		During operation with 2 section switches, 1 section switch has not opened correctly following an error. The SMA Grid Gate is blocked. **Corrective measures:** • Check function of the section switches and eliminate the error displayed (see Section 9 "Troubleshooting", page 28). • Reset blockade manually (see Section 8.8 "Manually Resetting Blockade of the SMA Grid Gate", page 27).

9.2 Messages in the Status Bar

The following status and error messages can be displayed in the status bar. The error messages can result from hardware errors, relay errors or grid errors.

Message	Explanation and corrective measures
LOCKED	Parameters are being set. Section switches are open. The SMA Grid Gate cannot connect.
ExtOFF (XX)	The parameter **DigIn1** is set to **ExtOFF** and no voltage is present at D1. "XX" stands for the number of remote shutdowns up until the present time.
R12 ON, wait for K1	Connection of power generation plant to electricity grid Waiting for feedback contact K1, until 75% of voltage of phase 1 is exceeded.
R34 ON, wait for K2	Connection of power generation plant to electricity grid Waiting for feedback contact K2, until 75% of voltage of phase 1 is exceeded. This message only appears during operation with 2 section switches.
ON	Normal operation
Wxxxx	Waiting following grid error Before the power generation plant is connected to the electricity grid following a grid error, the SMA Grid Gate waits for the set connection time. "xxxx" stands for the remaining waiting time in seconds.
Wxxxx START	Start phase During the start phase the section switches are open. "xxxx" stands for the remaining waiting time in seconds.
ERR: Par(73)	At least 1 incorrect parameter has been found. Possible cause: Sudden switching off of the SMA Grid Gate when setting parameters. **Corrective measures:** • Restore default settings (see Section 8.5).
ERR: Par(82)	The country data sets of the two microcontrollers are not identical. Possible cause: Sudden switching off of the SMA Grid Gate when setting parameters. **Corrective measures:** • Restore default settings (see Section 8.5).
ERR: H1: xxxxxxxx ERR: H2: xxxxxxxx	Hardware errors **Corrective measures:** • Contact SMA Service Line.

Message	Explanation and corrective measures
ERR R:K1>>	Voltage on feedback contact K1 too high **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.
ERR R:K2>>	Voltage on feedback contact K2 too high **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.
ERR R:K1?	Connection procedure of section switch 1 has failed. **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.
ERR R:K2?	Connection procedure of section switch 2 has failed. **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.
ERR R:K1??	Voltage on feedback contact K1 too low although section switch 1 is closed **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.
ERR R:K2??	Voltage on feedback contact K2 too low although section switch 2 is closed **Corrective measures:** • Make sure that the SMA Grid Gate connection is correct. • Make sure that the section switches are functioning correctly. Replace section switches if necessary.

Message	Explanation and corrective measures
ERR R:K1<->K2	Feedback contact interchanged **Corrective measures:** • Make sure that the connection of the feedback contacts is correct.
ERR R:RELTEST	Trigger test for the section switches has been carried out. **Corrective measures:** • Wait until time set under **Connection time** has expired.
ERR R: Finish LOCK	LOCKED status ended
ERR L1 U<<	Undervoltage N-L1
ERR L2 U<<	Undervoltage N-L2
ERR L3 U<<	Undervoltage N-L3
ERR L12 U<<	Undervoltage L1-L2
ERR L23 U<<	Undervoltage L2-L3
ERR L31 U<<	Undervoltage L3-L1
ERR L1 U<	Undervoltage N-L1
ERR L2 U<	Undervoltage N-L2
ERR L3 U<	Undervoltage N-L3
ERR L1 U>	Overvoltage N-L1
ERR L2 U>	Overvoltage N-L2
ERR L3 U>	Overvoltage N-L3
ERR L1 U>>	Overvoltage N-L1
ERR L2 U>>	Overvoltage N-L2
ERR L3 U>>	Overvoltage N-L3
ERR L12 U<	Undervoltage L1-L2
ERR L23 U<	Undervoltage L2-L3
ERR L31 U<	Undervoltage L3-L1
ERR L12 U>	Overvoltage L1-L2
ERR L23 U>	Overvoltage L2-L3
ERR L31 U>	Overvoltage L3-L1
ERR L12 U>>	Overvoltage L1-L2
ERR L23 U>>	Overvoltage L2-L3
ERR L31 U>>	Overvoltage L3-L1
ERR L1 Ua>	Overvoltage N-L1 (10 minutes average value)

Message	Explanation and corrective measures
ERR L2 Ua>	Overvoltage N-L2 (10 minutes average value)
ERR L3 Ua>	Overvoltage N-L3 (10 minutes average value)
ERR L12 Ua>	Overvoltage L1-L2 (10 minutes average value))
ERR L23 Ua>	Overvoltage L2-L3 (10 minutes average value)
ERR L31 Ua>	Overvoltage L3-L1 (10 minutes average value)
ERR f<<	Under-frequency
ERR f<	Under-frequency
ERR f<c	Under-frequency*
ERR f>>	Over-frequency
ERR f>	Over-frequency
ERR f>c	Over-frequency*

* This error is only present if **DigIn2** is set to **ExtComm** and no communication is active at **D2**.

9.3 Error Messages

The following error messages can appear in the graphic display in the following situations:

- In the start phase
- When locking and unlocking the SMA Grid Gate
- When setting and altering parameters
- When setting the country data set

Error message	Explanation and corrective measures
For locking the device	The communication of the two microcontrollers is disturbed. **Corrective measures:** • Disconnect the SMA Grid Gate from voltage sources (see Section 10). • Wait 1 minute. • Re-commission the SMA Grid Gate (see Section 7).
This selection not possible due to undervoltage	The country data set cannot be loaded due to undervoltage. • Corrective measures: • Make sure that the SMA Grid Gate connection is correct. • Press bottom button. • Reload country data set or reselect the number of section switches.
For parameters to load	The communication of the two microcontrollers is disturbed. **Corrective measures:** • Reload country data set (see Section 8.5).
Disallowed due to parameter error	Parameter error **Corrective measures:** • Reload country data set (see Section 8.5).
For setting the parameter	Error when setting a parameter **Corrective measures:** • Re-set the parameter.
For setting the new parameter checksum	The communication of the two microcontrollers is disturbed or the parameter check sum cannot be written. **Corrective measures:** • Ensure that sufficient voltage is present. • Re-set the parameter.

Error message	Explanation and corrective measures
At conclusion of initialization	Error during the start phase **Corrective measures:** • Re-set number of section switches.

For unlocking the device	The communication of the two microcontrollers is disturbed.
	Corrective measures:
	• If the error message appears when selecting the number of section switches, proceed as follows:
	  • Press bottom button.
	  • Re-set number of section switches.
	• If the error message appears after entry of the SMA Grid Guard code and the status **LOCKED** appears in the status bar of the **Overview**, proceed as follows:
	  • Disconnect the SMA Grid Gate from voltage sources (see Section 10).
	  • Wait 1 minute.
	  • Re-commission the SMA Grid Gate (see Section 7).

9.4 Stored Error Messages

The SMA Grid Gate stores the last 12 error messages that have resulted in disconnection of the SMA Grid Gate. These can be read in the **Error messages** menu.

Message	Explanation and corrective measures
1 U<<	Undervoltage N-L1
2 U<<	Undervoltage N-L2
3 U<<	Undervoltage N-L3
4 U<<	Undervoltage L1-L2
5 U<<	Undervoltage L2-L3
6 U<<	Undervoltage L3-L1
7 U>>	Overvoltage N-L1
8 U>>	Overvoltage N-L2
9 U>>	Overvoltage N-L3
10 U>>	Overvoltage L1-L2
11 U>>	Overvoltage L2-L3
12 U>>	Overvoltage L3-L1
13 U<	Undervoltage N-L1
14 U<	Undervoltage N-L2
15 U<	Undervoltage N-L3
16 U<	Undervoltage L1-L2
17 U<	Undervoltage L2-L3
18 U<	Undervoltage L3-L1
19 U>	Overvoltage N-L1
20 U>	Overvoltage N-L2
21 U>	Overvoltage N-L3
22 U>	Overvoltage L1-L2
23 U>	Overvoltage L2-L3
24 U>	Overvoltage L3-L1
31 Ua>	Overvoltage N-L1 (10 minutes average value)
32 Ua>	Overvoltage N-L2 (10 minutes average value)
33 Ua>	Overvoltage N-L3 (10 minutes average value)
34 Ua>	Overvoltage L1-L2 (10 minutes average value)
35 Ua>	Overvoltage L2-L3 (10 minutes average value)

Message	Explanation and corrective measures
36 Ua>	Overvoltage L3-L1 (10 minutes average value)
52 f<<	Under-frequency
53 f>>	Over-frequency
54 f<	Under-frequency
55 f<	Over-frequency
56 f<c	Under-frequency
57 f>c	Over-frequency
61 K??	Voltage at feedback contact too low
64 RT	Trigger test for the section switches has been carried out.
73 PAR	At least 1 incorrect parameter has been found. Possible cause: Sudden switching off of the SMA Grid Gate when setting parameters. **Corrective measures:** • Restore default settings (see Section 8.5).
82 PAR	The country data sets of the two microcontrollers are not identical. Possible cause: Sudden switching off of the SMA Grid Gate when setting parameters. **Corrective measures:** • Restore default settings (see Section 8.5).
XX HRD	Hardware error **Corrective measures:** • Contact SMA Service Line.

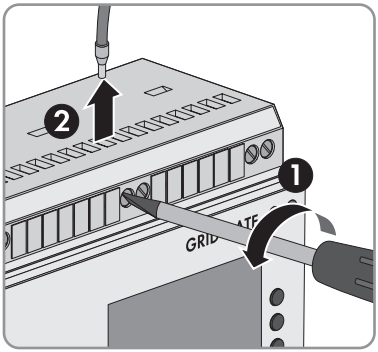
10 Disconnecting the SMA Grid Gate from Voltage Sources

3. De-commission the power generation plant (see installation manual of power generation plant).
4. Disconnect the miniature circuit-breaker of the electricity grid and secure against reconnection.
5. Switch off fuses of the SMA Grid Gate.
6. Wait 1 minute before the SMA Grid Gate switches off completely.
7. Ensure that no voltage is present.

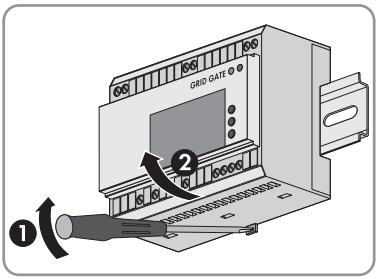
11 Decommissioning

11.1 Disassembling the SMA Grid Gate

1. Disconnect the SMA Grid Gate from voltage sources (see Section 10). When doing so, take note of the five safety rules.
2. Release the screw terminal using a screwdriver and remove the cable.



3. Press the retaining clamp down using a screwdriver and remove the SMA Grid Gate from the top-hat rail by turning it gently.



11.2 Packaging the SMA Grid Gate

- Package the SMA Grid Gate. To do so, use the original packaging or packaging that is suitable for the weight and size of the SMA Grid Gate.

11.3 Disposing of the SMA Grid Gate

- Dispose of the SMA Grid Gate in accordance with the applicable disposal regulations for electronic waste.

  or

- Return the SMA Grid Gate to SMA Solar Technology AG at your own expense (see section 13 "Contact", page 41). When doing so, label the packaging with the information "ZUR ENTSORGUNG" (for disposal).

12 Technical Data

AC input

AC line voltage	230 V
AC voltage range	46 V ... 300 V
Connection line conductors	3/N
AC power frequency	50 Hz
Operating range for AC power frequency	44 Hz ... 52 Hz
Typical power consumption	1 W

Digital inputs

Voltage supply	12 V ... 24 V

Section Switch/Feedback Contact

Maximum control voltage	250 V
Maximum control current	6 A

Protective Devices

AC short-circuit current capability	16 A
Protection class according to IEC 62103)	II
Overvoltage category as per IEC 60664-1	III

Climatic Conditions for Operation

Climatic class as per IEC 60721-3-3	3K5
Temperature range	– 20°C ... +50°C
Humidity range*	10% ... 90%
Air pressure range	70 kPa ... 106 kPa
Degree of protection	IP20
Altitude above MSL	0 m ... 3,000 m

* non-condensing

Climatic Conditions for Storage/Transport

Temperature range	– 40°C ... 70°C
Relative humidity, non-condensing	5% ... 95%
Altitude above MSL	0 m ... 10,500 m

General Data

Width x height x depth	100 mm x 75 mm x 55 mm
Weight	200 g
Mounting location	Indoors, protected from dust and water
Measurement accuracy	1%

Features

Connection	Screw terminal
Status display	2 LEDs
Display	Graphic display
Country standards	CEI 0-21

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Managing Board: Jürgen Dolle, Roland Grebe, Pierre-Pascal Urbon, Marko Werner

EC Declaration of Conformity

with the Guidelines of the European

- Electromagnetic Compliance 2004/108/EC
- Low Voltage 2006/95/EC

The device listed below has been developed, designed and manufactured in accordance with the above-mentioned EC directives. The applied harmonized standards are shown in the following table.

	SMA Grid Gate
	GRIDGATE-11
Electromagnetic interference:	
EN 61000-6-3:2007	✓
EN 61000-6-4:2007	✓
Grid perturbations:	
EN 61000-3-2:2006 + A1:2009 + A2:2009	✓
EN 61000-3-3:2008	✓
Electromagnetic compatibility:	
EN 61000-6-1:2007	✓
EN 61000-6-2:2005	✓
Device safety:	
EN 50178:1997	✓
	CE

✓ Standard applicable
✖ Standard not applicable

Information:
Without an explicit written confirmation by SMA, this declaration of conformity is no longer valid if:

- the product is modified, supplemented or changed in any other way,
- components which are not part of the SMA accessories kit, are integrated in the product, as well as if the product is used or installed improperly.

Niestetal, 2012-08-10
SMA Solar Technology AG

ppa. Frank Greizer

ppa. Frank Greizer
(Vice President MP T PD)

Declaration of Conformity

with German, European and International (Non-European) standards used for

SMA GRID GATE

German Standard DIN EN		European Standard EN		International Standard IEC (IEC/CISPR)
DIN EN 61000-6-1:2007-10	based on	EN 61000-6-1:2007	based on	IEC 61000-6-1:2005
DIN EN 61000-6-2:2006-03	based on	EN 61000-6-2:2005	based on	IEC 61000-6-2:2005
DIN EN 61000-6-3:2007-09	based on	EN 61000-6-3:2007	based on	IEC 61000-6-3:2006
DIN EN 61000-6-4:2007-09	based on	EN 61000-6-4:2007	based on	IEC 61000-6-4:2006
DIN EN 61000-3-2:2010-03	based on	EN 61000-3-2:2006 + A1:2009 + A2:2009	based on	IEC 61000-3-2:2005 + A1:2008 + A2: 2009
DIN EN 61000-3-3:2009-06	based on	EN 61000-3-3:2008	based on	IEC 61000-3-3:2008
DIN EN 61000-3-11:2001-04	based on	EN 61000-3-11:2000	based on	IEC 61000-3-11:2000
DIN EN 61000-3-12:2005-09	based on	EN 61000-3-12:2005	based on	IEC 61000-3-12:2004
DIN EN 50178:1998-04	based on	EN 50178:1997	based on	IEC 62103:2003

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SMA Factory Warranty

The current warranty conditions come enclosed with your device. These are also available online at www.SMA-Solar.com and can be downloaded and are available on paper from the usual sales channels if required.

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